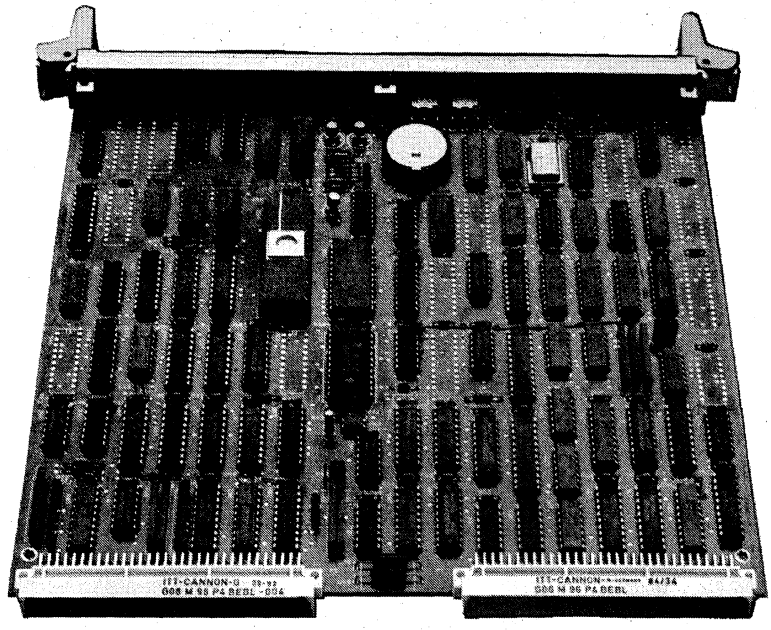
iSBC® CSM/001
CENTRAL SERVICES MODULE

- **iSBC® CSM/001 Central Services Module Integrates MULTIBUS® II Central System Functions on a Single Board**
- **MULTIBUS® II Parallel System Bus Clock Generation for all Agents Interfaced to the MULTIBUS II iPSB Bus**
- **System-wide Reset Signals for Power-up, Warm Start, and Power Failure/ Recovery**
- **System-wide Time-out Detection and Error Generation**
- **Slot I.D. and Arbitration I.D. Initialization**
- **MULTIBUS II Interconnect Space for Software Configurability and Diagnostics**
- **Built-In Self Test (BIST) Power-up Diagnostics with LED Indicator and Error Reporting Accessible to Software via Interconnect Space**
- **General Purpose Link Interface to Other Standard (MULTIBUS I) or Proprietary Buses**
- **Time-of-day Clock Support with Battery Back-up on Board**
- **Double-high Eurocard Standard Form Factor, Pin and Socket DIN Connectors**

The iSBC CMS/001 Central Services Module is responsible for managing the central system functions of clock generation, power-down and reset, time-out, and assignment of I.D.s defined by the MULTIBUS II specification. The integration of these central functions in a single module improves overall board area utilization in a multi-board system since these functions do not need to be duplicated on every board. The iSBC CMS/001 module additionally provides a time-of-day clock and the general purpose link interface to the other standard (MULTIBUS I) or proprietary buses.



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FUNCTIONAL DESCRIPTION

Overall

The iSBC CMS/001 Central Services Module integrates MULTIBUS II central system functions on a single board. Each MULTIBUS II system requires management of these central system functions as defined in the MULTIBUS II specification. Figure 1 illustrates a typical multiprocessing MULTIBUS II system configuration. To perform its central system functions, the iSBC CSM/001 Central Services Module has a fixed slot I.D. and location in the backplane. The iSBC CSM/001 board additionally provides an interface to the MULTIBUS I Link board and a time-of-day clock.

Architecture

The iSBC CSM/001 board is functionally partitioned into 6 major subsystems. The Central System Wide Control subsystem includes MULTIBUS II iPSB bus clock generation and system wide reset signal generation. The Time-Out Control subsystem provides system wide time out detection and error generation. The System Interconnect Space subsystem controls I.D. initialization and software configurable interconnect space. The Link Board interface subsystem provides an interface to the MULTIBUS I Link board or links to other buses. The last two subsystems are of the Time-of-Day clock and the iPSB bus interface. These areas are illustrated in Figure 2.

CENTRALIZED SYSTEM-WIDE CONTROL SUBSYSTEM

Parallel System Bus Clock Generation

The CSM generates the Parallel System Bus clocks. The Bus Clock (BCLK*) 10 MHz signal and the Constant Clock (CCLK*) 20 MHz signal are supplied by CSM to all boards interfaced to the Parallel System Bus. These boards use the Bus Clock 10 MHz signal for synchronization, system timing, and arbitration functions. The Constant Clock is an auxiliary clock. The frequency of the Bus Clock and Constant Clock can be halved via jumpers for diagnostic purposes.

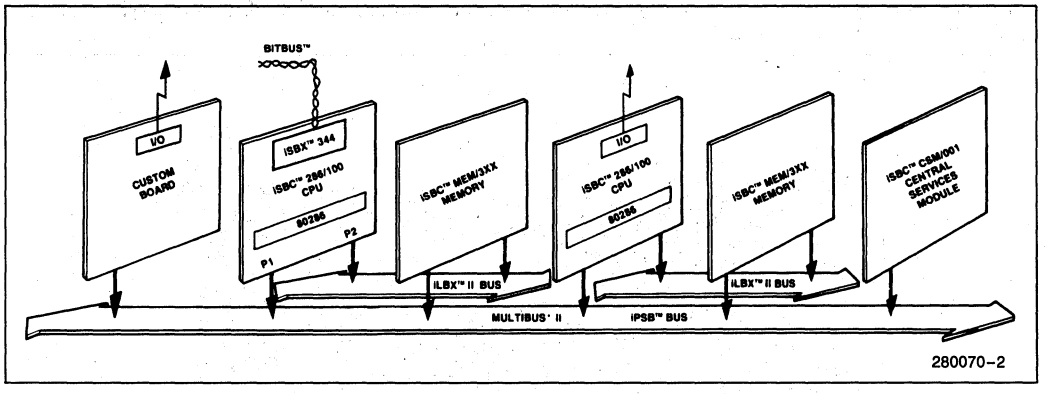

Figure 1. Typical MULTIBUS® II System Configuration

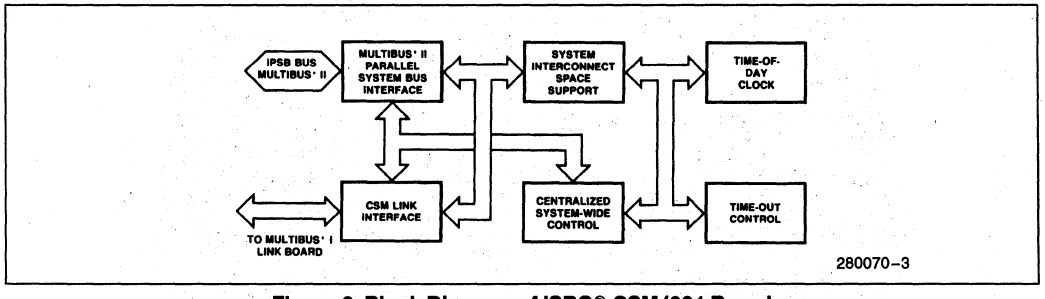

Figure 2. Block Diagram of iSBC® CSM/001 Board

Reset Control and Power-Fail/ Recovery

The CSM sends a system-level reset/initialization signal to all boards interfaced to the Parallel System Bus. The CSM assigns slot I.D. and arbitration I.D. to these boards during this initialization process. It provides this signal upon pressing of the reset switch, restoration of system power or a software request for reset received via the CSM interconnect space. The reset switch may be jumper-configured to cause a power-up or warm reset, with cold reset the default configuration. The reset switch is located on the front panel. Additionally, warm reset and cold reset signals can be input through the P2 connector.

The CSM power supply interface is accomplished via the ACLO input of the P2 connector. ACLO is an open collector input from the power supply which provides advance warning of imminent power fail. If battery backup is not required, a jumper is provided on the CSM to disable the power fail signal ACLO.

TIME-OUT SUBSYSTEM

The TIMOUT* (Time-Out) signal is provided by the CSM whenever it detects the failure of a module to complete a handshake. This TIMOUT* signal is received by all boards interfaced to the iPSB bus and may be disabled via the interconnect space.

INTERCONNECT SUBSYSTEM

The CSM Interconnect subsystem provides arbitration I.D., and slot I.D. initialization, software configurable interconnect space, and on-board diagnostics capability.

At reset, the CSM supplies each board interfaced to iPSB bus with its slot I.D. and its arbitration I.D. The slot I. D. assignment allows user or system software to address any board by its physical position in the backplane.

The interconnect space has both read-only and software configurable facilities. The read-only registers hold information such as vendor number and board type, so that this information is available to the system software. The CSM software configurable interconnect space allows write operations to support board configuration and diagnostics under software control. The CSM also uses interconnect space for system wide functions such as providing a time/date record (from time-of-day clock), software access to diagnostics and software control of the system wide functions.

BUILT-IN-SELF-TEST (BIST) DIAGNOSTICS

Self-test/diagnostics have been built into the heart of the MULTIBUS II system. These confidence tests and diagnostics improve reliability and reduce manufacturing and maintenance costs. LED 1 (labeled BIST) is used to indicate the status of the Built-In-Self-Test. It is turned on when the BIST starts running and is turned off when the BIST completes successfully. In addition, all error information is recorded in interconnect space so it is accessible to software for error reporting.

The Built-In-Self-Tests performed by the on-board microcontroller at power-up or at software command are:

1. PROM Checksum Test—Verifies the contents of the 8751 microcontroller.
2. RAM Test—Verifies that each RAM location of the 8751 microcontroller may store 0's and 1's by complementing and verifying twice each RAM location.
3. Real Time Clock Chip RAM Test—Verifies that reads and writes to the RAM locations on Real Time Clock Chip are functional.
4. Real Time Clock Test—Reads and writes all RAM locations of the RTC chip. Not run at power-up due to destructive nature.
5. Arbitration/Slot I.D. Register Test—Verifies that arbitration and slot I.D.s can be read and written from on-board.
6. 8751 Status Test—Verifies that input pins of the 8751 are at correct level.
7. Clock Frequency Test—Tests accuracy of Real Time Clock to 0.2% against bus clock.

CSM LINK INTERFACE

The CSM Link Interface and the MULTIBUS I iSBC LNK/001 board provides a bridge between MULTIBUS I and MULTIBUS II systems. Hybrid systems can be built for development or target. The CSM Link Interface uses the P2 connector on the iSBC CSM/001 module for transferring commands and data from MULTIBUS II to a MULTIBUS I Link board. The MULTIBUS I Link board (iSBC LNK/001) is purchased separately from the iSBC CSM/001 board and includes the cable which connects the iSBC CSM/001 board and the MULTIBUS I Link board (see Figure 3).

The CSM Link Interface supports 8- or 16-bit transfers via a 16-bit address/data path. The iSBC LNK/001 board resides in the MULTIBUS I system and provides a memory and I/O access window to MULTIBUS I from the MULTIBUS II Parallel System Bus. Only one iSBC LNK/001 board can be connected to the iSBC CSM/001 module.

TIME-OF-DAY CLOCK SUBSYSTEM

The Time-Of-Day Clock subsystem consists of a clock chip, battery, and interface circuitry. The clock provides time keeping to 0.01% accuracy of fractions of seconds, seconds, minutes, hours, day, day of week, month, and year. This information is accessible via the interconnect space. The battery backup for the clock chip provides 2 years of operation.

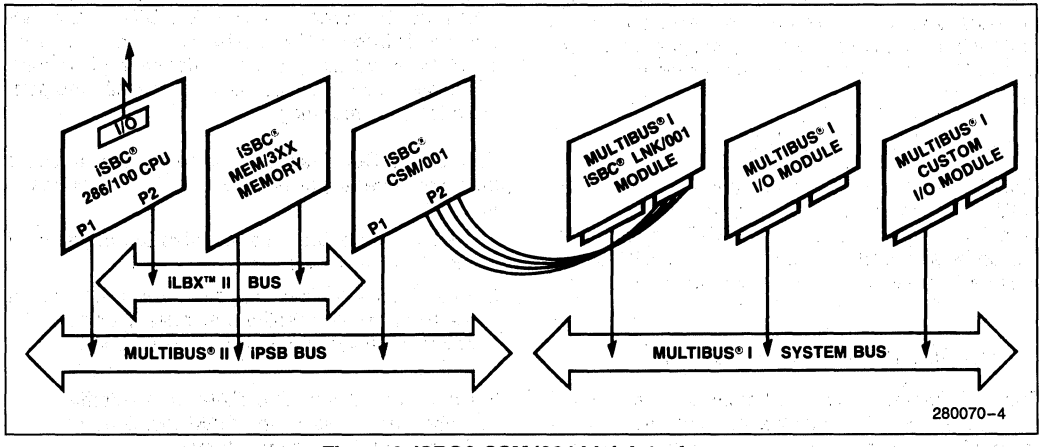

Figure 3. iSBC® CSM/001 Link Interface

SPECIFICATIONS

System Clocks

BCLK* (Bus Clock)	10 MHz
CCLK* (Constant Clock)	20 MHz
LCLK* (Link Clock)	10 MHz

Jumper option available to divide these frequencies in half

Interface Compliance

MULTIBUS II Bus Architecture Specification (#146077)

Link Cable

The Link cable uses a 64-conductor ribbon cable for interconnecting the CSM board to the Link Board. The maximum length for the cable is 1 meter.

Interface Specifications

Location	Function	Part #
P1	iPSB Bus	603-2-IEC-C096F
P2	Link and Remote Services	603-2-IEC-C064-F

PHYSICAL DIMENSIONS

The iSBC CSM/001 board meets all MULTIBUS II mechanical specifications as presented in the MULTIBUS II specification (#146077).

Double-High Eurocard Form Factor:

Depth:	220 mm. (8.7 in.)
Height:	233 mm. (9.2 in.)
Front Panel Width:	20 mm. (0.78 in.)
Weight:	4820 gm. (16.5 oz.)

ENVIRONMENTAL REQUIREMENTS

Temperature: (inlet air) at 200 LFM airflow over boards

Non-operating: −40 to +70°C
Operating: 0 to +55°C

Humidity: Non-operating: 95% RH @ 55°C
Operating: 90% RH @ 55°C

POWER REQUIREMENTS

Voltage (volts)	Current (amps)
+5	6A (max.)
+5 VBB	1A (max.)

BATTERY CHARACTERISTICS

3V nominal voltage; capacity of 160 milliamp hours minimum.

BATTERY DIMENSIONS

Outside dimension	20 mm–23 mm
Height	1.6 mm–3.2 mm

REFERENCE MANUALS

iSBC CSM/001 Board Manual (#146706-001)

Intel MULTIBUS II Bus Architecture Specification (#146077)

Manuals may be ordered from any Sales Representative, Distributor Office, or from the Intel Literature Department, 3065 Bowers Ave., Santa Clara, CA 95051.

ORDERING INFORMATION

Part Number	Description
iSBC CSM/001	MULTIBUS II Central Services Module